

whipTail™  
tech | Racerunner™  
*A Solid-State SAN Appliance*

## Frequently Asked Questions



## Who is WhipTail Tech?

WhipTail Tech, a **SAN solid-state storage manufacturer**, was founded in 2008 in Summit, NJ. The company is named after the WhipTail Racerunner lizard, an extremely fast species indigenous to the southwestern United States. The Racerunner SSD SAN array was released to "general availability" late 2008.

## What is SSD?

A solid-state device or drive (SSD) is the next generation of data storage. The architecture of an SSD does not employ rotating disks at all. A SSD utilizes a memory chip with erasable, writable cells that can hold data even when powered off. Solid-state memory is in popular consumer devices such as iPhones, Blackberries, digital cameras, etc.

## What are the advantages of SSD's over traditional magnetic disks?

This is the fun part...

- **Speed.** Clients will see incredible increases in performance up to 30X (60X latency advantage) so that large reports that used to take 24 hours can now take minutes.
- **Dramatically Lower TCO.** Racerunners can replace a fully populated storage shelf at a 1:30 ratio and eliminate up to 90% power and space, which is huge for Green IT initiatives.
- **Durability.** The underlying architecture allows for more stability and endurance in non-optimal environments (e.g. heat, cold).

## What is the Racerunner?

The Racerunner is a patent-pending Solid-State SAN appliance. Not a single solid-state drive, but rather an array of drives overlaid with expert software to create a powerful primary storage device that accelerates mission critical data and dramatically expands virtual capacity.

## What is the Racerunner's performance?

- 150,000 IOPS

## What protocol does the Racerunner support?

- Fiber Channel, iSCSI, Infinband, NFS, CIFS

## What are the optimal application candidates for a Racerunner?

With Intel and AMD breaking new barriers with CPU technology, servers today are being starved for data; the current magnetic spinning disk storage arrays are maxed-out on their speed (15K). The future is solid-state storage, and that future is now.

Examples of those applications which require a higher a higher performing array than magnetic legacy spinning disks can provide...

- Virtualized Desktops or "VDI"
- Server Virtualization
- Poor Performing Applications (email, ERP, CRM)
- Enterprises with highly transactional online applications (OLTP)

## How does a Racerunner help Scale Virtual Desktops (VDI?)

No matter which flavor of virtual desktop an enterprise is reviewing (XenDesktop, View, Symantec, Red Hat, etc) one major challenge has become the barrier to entry: the overwhelming storage infrastructure required to support this kind of computing architecture. While the paradigm shift of virtual desktops (hosted desktops, cloud-desktops, etc.) is finally being accepted by the user-community as a concept, it is still in it's infancy in data-center practicality. Common Tier One storage (EMC, NetApp, etc) and their Fiber Channel HDD arrays deliver only 200 IOPS per drive. Depending on how you gauge it, a virtual desktop requires anywhere from 20–40 IOPS per image to run at a satisfactorily level. Thus, a 5,000 user environment would require approximately 250,000 IOPS to minimally perform to user expectations and standards. At 200 IOPS per HDD, you would need 625 drives to meet this performance requirement. (This puts the performance cost at \$8 per I/O operation per second vs. 37 cents with a Racerunner.) The total cost for a 625 drive FC storage array including drives, enclosures, controllers, etc will be over SEVEN-figures upfront and consume 60+ units of data center rack space. Thus, between the excessively high initial CAPEX expenditure, the ongoing costs are high (power, cooling, cost for rack space), the ROI is difficult to realize and many VDI projects stall as they simply can not be business justified.

When solid-state drives are offered by the primary Tier One HDD manufacturers, they land in a price-point upwards of \$35,000 per drive that will deliver only 6,000 IOPS each. Due to a lack of mastery in the nuances of SSD's, adding shelf after shelf of these expensive drives will not add to the performance, which normally is maxed out around 60,000 IOPS. At an investment cost of \$350,000 and without seeing the dramatic performance increase, the cost lands around \$6 per I/O operation per second. Another no-go for the majority of enterprises today.

The WhipTail Racerunner offers the best cost per I/O operation on the market. It is sold as a 2 unit appliance in your choice of capacity (1.5 TB, 3.0 TB, 6.0 TB,) with an all inclusive MSRP starting at \$49,000. A game-changing, VDI-enabling cost to our clients of 37 cents per I/O. **Welcome to the new world order.**

## Why does Racerunner work so well with Databases?

With the dramatic pace of development from chipmakers Intel and AMD, today's enterprise servers are simply being starved for data. Processing speeds have increased exponentially, while the speed at which a disk spins has not changed in over 7 years — a lifetime in the world of computers. This performance delta between the two is only being exacerbated by each release of their respective chips (Nehalem and Shanghai respectively.) The underlying issue is this: database workloads are extremely demanding on traditional spinning disk systems. The majority of the traffic is based on extremely small request sizes and is often random in nature. The mechanical latency is a limiting factor in database performance. Barring a cache "hit" (data already being in a RAM buffer) each request will likely require the movement of the read/write head incurring a 6–9 ms penalty while the head is moved and the data is retrieved. Adding in the speed limitations of traditional disks being 15,000 RPM (unless you like micro-sonic booms in your servers that is), they can perform at a sustained 200 I/O operations per second; it becomes clear that a customer will need to over-invest in a large number of drives just to gain even a moderate performance increase. This vicious circle is one of the largest challenges facing enterprises today, and is directly responsible for the huge % of an enterprise's IT budget being allocated strictly for storage — in many cases over 60%.

The solid-state Racerunner is specifically tuned for low latency high I/O environments. Its horsepower more than accommodates for the demanding requests of today's Nehalem and Shanghai processors with its proven ability to do over 150,000 I/O operations per second at small request sizes (4K) with sub millisecond latency. With its minimal data-center footprint of 2U, and limited power consumption (<200 watts), the Racerunner is a strategic solution in allowing an IT department to get ahead-of-the-curve when deploying new applications and projects.

## What is In-line Data Deduplication?

Data Deduplication is a method of reducing redundant data. While many companies offer a similar technology to reduce backup or recovery storage (Data Domain, NetApp, Symantec, etc.), WhipTail is the ONLY vendor currently offering in-line data Deduplication, where data redundancy is eliminated on the ingress at a block level. This is the holy grail of deduping because it dramatically decreases the amount of storage an enterprise requires. This is of huge benefit in virtualized environments, and is critical in establishing Tier 0 performance as a viable solution for the enterprise.

In-line data deduplication is a standard feature of the Racerunner. Each enterprise can customize their experience by turning in-line deduping, per LUN, on or off at will. So whether they are optimizing virtualization, accelerating data, or toggling between the two, the Racerunner provides optimal business flexibility and performance to meet ever changing needs.

## How does it help reduce my storage for VMware ESX or Xen servers?

By turning on the in-line data deduplication/compression features, the Racerunner allows you to go way beyond thin provisioning. By eliminating the need to store repetitive data, there is no need to continue to waste Tier One storage supporting hundreds of copies of your VMs operating system (usually MS 2003, 2007, etc) The Racerunner allows you to dramatically optimize your storage in this scenario by only needing enough space to store 10–15% of what you currently have provisioned. Since the Racerunner's in-line deduping engine is truly "on-the-fly" and not run in backup or as a batch-job during off-peak hours, you never have to store duplicate data. This allows companies to extend the value of their current investment in HDD's by simply re-allocating the multiple Terabytes of freed-up spinning disks to alternative databases or environments.

In parallel, our clients see further consolidation ratios thanks to our compression capabilities within the Racerunner. Though databases don't usually have a heavy dose of repetitive data, they are alpha-numeric and therefore can compress extremely well — up to 4:1 is common.

## What is it about Virtualization that is starting to be a major challenge?

- Virtualization environments are typically over-subscribed when it comes to disk performance. Everyone is competing for the same pool of resources. This is typically not a problem in an environment where low utilization servers have been virtualized. However, when mid-large organizations try to virtualize Tier One applications (Exchange, etc) major disk performance issues often emerge. Oversubscribed disk systems are notoriously hard to identify. CPU and Memory usage is much more "in the face" of administrators. Disk systems require intimate knowledge of the underlying disk infrastructure and the workloads running on them. Virtualization can make this even more challenging as most monitoring and management tools only show you the amount of data being transferred back and forth.
- Since many systems are competing for the same disk resource, it can turn a SEQUENTIAL workload into a much more demanding RANDOM workload (RANDOM being the worst possible workload for a mechanical disk). This is because in virtualization, every VM gets a timeslice of every available resource (CPU, MEMORY, DISK, other IO, etc). Thus, a nice sequential file transfer (say a really big ISO image) gets interrupted every so many milliseconds by another fileservers or an Exchange server, causing the read/write head to be moved to another track, incurring a seek penalty.

Since the Racerunner SAN is completely solid-state in nature, average data access time is sub-millisecond (0.1ms.) Essentially, SEQUENTIAL and RANDOM workloads are no different to a Racerunner.

- While virtualization overhead can be seen as low (6–15%) it is still significant and impacts performance for IO intensive applications. The Racerunner’s latency advantage (even with 15% overhead) is 30–60X faster than running without a hypervisor. The Racerunner SAN allows enterprises to finally recognize the value of virtualizing this tier of applications by making the “performance pool” dramatically larger, eliminating the contention.

### **Doesn’t NetApp say that they can accomplish In-line Deduping?**

In reality, NetApp’s primary deduping is an attempt at delivering on the promise of primary storage that misses the mark. With their Deduplication the amount of storage needed will not be decreased and performance will greatly suffer as well. Their deduplication commits all writes to physical media during production hours. Consequently, customers require enough space to hold all of their data, on their most expensive storage, before reduction. At scheduled times the filer performs fingerprinting of all new data, compares it to the disk fingerprint table, and performs deduplication. This process is done as a batch job and is computationally intense, reducing performance while it is running.

### **Isn’t flash memory a candidate to wear out quickly? It’s very expensive to keep buying new drives...**

In almost every scenario, the answer would be yes. However, all versions of the WhipTail Racerunner come embedded with our proprietary software that extends the lifetime of the drives to beyond seven (7) years...and dramatically optimize the potency of the underlying flash architecture. Thus, the Racerunner allows Tier 0 performance to be a realistic option as a primary SAN for enterprises today.

### **How long does it take to implement the Racerunner?**

**“LUN & DONE”**: Plug it into a power source (< 200 watts), attach Network Protocol, assign LUNs. Rinse. Repeat.

### **Can I procure a Racerunner for an evaluation?**

Absolutely. WhipTail has a corporate evaluation program. Simply contact us by phone: (908) 743-1280 or visit the website, [www.whiptailtech.com](http://www.whiptailtech.com), to submit your information for a 30-day evaluation.

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